

BEFORE
THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

SURREBUTTAL TESTIMONY
OF
AARON L. ROTHCHILD

ON BEHALF OF
THE SOUTH CAROLINA DEPARTMENT OF CONSUMER AFFAIRS
Docket No. 2019-290-WS

February 14, 2020

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1 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS?**

2 **A.** My name is Aaron L. Rothschild my business address is 15 Lake Road, Ridgefield, CT.

3 **Q. HAVE YOU PREVIOUSLY PRESENTED TESTIMONY IN THIS**
4 **PROCEEDING?**

5 **A.** Yes. My Direct Testimony was presented on behalf of the South Carolina Department of
6 Consumer Affairs (“Consumer Advocate”) on January 23, 2020.

7 **I. SUMMARY OF MR. D’ASCENDIS’ COMMENTS**
8

9 **Q. WHAT IS THE PURPOSE OF YOUR SURREBUTTAL TESTIMONY?**

10 **A.** The purpose of my Surrebuttal Testimony is to respond to the following issues addressed
11 in Company witness Paul D’Ascendis’ Rebuttal Testimony:

12 II. Definition of the Cost of Equity

13 III. Application of DCF Model

14 IV. Application of CAPM

15 V. Current Market Environment

16 VI. Adjustments to Cost of Common Equity

17 VII. Non-Price Regulated Proxy Group

18 As addressed below, Mr. D’Ascendis’ criticisms are invalid and should be rejected.
19
20
21

II. DEFINITION OF THE COST OF EQUITY

Q. ON PAGES 45-51 OF HIS REBUTTAL TESTIMONY, MR. D’ASCENDIS STATES THAT YOU DO NOT BELIEVE THE COST OF EQUITY SHOULD BE BASED ON EXPECTED MARKET CONDITIONS. PLEASE RESPOND.

A. Mr. D’Ascendis’ interpretation is incorrect. I believe the cost of equity should be based on investor expectations, including what they expect market conditions will be in the future. As discussed throughout my Direct Testimony, my cost of equity recommendation is based on the forecasts represented in market prices and direct measurements of investors’ expectations. My market-based approach is superior to using “expert” forecasts (e.g. Blue Chip Financial Forecasts) -- instead of what the market expects as indicated by market data -- for the following reasons. First, the actual cost of equity BGWC will pay when it raises money will be determined by the market and not by financial publications. Second, evidence supports that predicting capital markets (e.g. interest rates, stock prices) is virtually impossible.¹

Q. IS YOUR APPROACH TO CALCULATING THE COST OF CAPITAL CONSISTENT WITH THE FINANCIAL LITERATURE QUOTED IN MR. D’ASCENDIS’ REBUTTAL TESTIMONY REGARDING THE DEFINITION OF THE COST OF CAPITAL?

¹ Daniel Kahneman, *Thinking Fast and Slow* (New York: Farrar, Straus and Giroux, 2011): 215.

1 **A.** Yes. Mr. D’Ascendis provides quotations from financial textbooks and consulting firms
2 that he claims show I am mistaken that the cost of capital should be market-based. The
3 quotes he provides on pages 46-47 of his Rebuttal Testimony mostly stress that the cost
4 of capital should be based on investors’ expectations, which is a concept that forms the
5 foundation of my approach to calculating the cost of equity. My market-based Capital
6 Asset Pricing Model, (“CAPM”) utilizes stock option data because it measures investor
7 expectations directly. My Discounted Cash Flow (“DCF”) results represent investor
8 expectations because it uses the prices investors are willing to pay for water utility stocks
9 based on their expectations.

10 **III. APPLICATION OF CONSTANT GROWTH DCF**

11 **Q. PLEASE SUMMARIZE MR. D’ASCENDIS’ CRITICISM OF YOUR**
12 **APPLICATION OF DCF METHOD.**

13 **A.** Mr. D’Ascendis makes the following criticisms of my constant growth DCF method:

- 14 1. Relies on short-term security analyst forecasts;
- 15 2. Growth methodology is circular;
- 16 3. Ignores the basic principle of rate base / rate of return regulation;
- 17 4. External financing growth rate.

18 **Q. PLEASE COMMENT ON MR. D’ASCENDIS’ CLAIM THAT YOUR DCF**
19 **METHOD RELIES ON SHORT-TERM SECURITY ANALYST FORECASTS**
20 **THAT ARE NO LONGER THAN THE ONES HE USES IN HIS DCF ANALYSIS.**

1 **A.** The DCF growth component of my DCF method is different, and superior, to the one
2 used by Mr. D’Ascendis. My sustainable growth method uses these “short-term” analyst
3 forecasts to derive a sustainable long-term growth rate. Mr. D’Ascendis mechanically
4 uses these “short-term” forecasts (analyst earnings per share growth rates) as a proxy for
5 long-term growth without making the necessary adjustments required to obtain
6 sustainable growth.

7 As discussed in my Direct Testimony, sufficient care must be taken to be sure that
8 the growth rate “g” is representative of the constant sustainable growth required for the
9 answer from the constant growth form of the DCF model to be meaningful. My DCF
10 method assures the mathematical relationship between earnings, dividends, book value
11 and stock price is respected. Mr. D’Ascendis’ DCF method does not.

12 **Q.** **ON PAGES 58-62 OF HIS REBUTTAL, MR. D’ASCENDIS CLAIMS THAT**
13 **EARNINGS PER SHARE GROWTH ARE THE SUPERIOR OPTION IN**
14 **SELECTING PROJECTED GROWTH IN A DCF MODEL. HOW DO YOU**
15 **RESPOND?**

16 **A.** I disagree. A study conducted by McKinsey & Company in 2010 found that “analysts
17 have been persistently over optimistic for the past 25 years with estimates ranging from
18 10 to 12 percent a year, compared with actual earnings growth.”

19 On average, analysts’ forecasts have been almost 100 percent too high.

1 Capital markets, on the other hand, are notably less giddy in their predictions.
2 Except during the market bubble of 1999-2001, actual price-to-earnings ratios have been
3 25 percent lower than implied P/E ratios based on analyst forecasts.

4 Even if equity analysts' forecasts are not upwardly biased, as discussed in my
5 Direct Testimony, adding earnings per share growth forecasts to a dividend yield without
6 considering the retention rate produces a flawed result.

7 **Q. PLEASE COMMENT ON MR. D'ASCENDIS' CLAIM THAT YOUR DCF**
8 **METHOD IS FLAWED BECAUSE IT IS CIRCULAR.**

9 **A.** Mr. D'Ascendis claims that my DCF method is circular because the result (if authorized)
10 would become one of the model inputs.² His claim is false because, among other reasons,
11 my DCF results are based on companies in other jurisdictions. If authorized, my DCF
12 results would not be applied to the companies in my Water Proxy Group. There is no
13 circularity. Additionally, my DCF results are based on a point in time (December 31,
14 2019) and therefore if allowed, my DCF results could not impact investor expectations
15 back in May without a time machine.

16 **Q. PLEASE COMMENT ON MR. D'ASCENDIS' CLAIM THAT YOUR DCF**
17 **METHOD IGNORES THE BASIC PRINCIPLES OF RATE BASE / RATE OF**
18 **RETURN REGULATION.**

² Mr. D'Ascendis' Rebuttal Testimony, page 55, lines 3-15.

1 **A.** Mr. D’Ascendis’ position is without sound foundation. My approach to estimating an
2 appropriate cost of equity for BGWC does recognize that it will be applied to book value.
3 Applying a market-based cost of equity to book value is consistent with the regulatory
4 principles of original cost ratemaking. Applying a market-based cost of equity to
5 anything other than the original cost of BGWC’s investments as measured by book value
6 would violate fundamental principles of original cost ratemaking and result in
7 overcharging consumers.

8 **Q. DO YOU AGREE WITH MR. D’ASCENDIS’ POSITION THAT THE DCF**
9 **MODEL IS NOT ACCURATE WHEN M/B RATIOS ARE NOT AT UNITY?**

10 **A.** No, I do not. The cost of capital is market-based. The price investors are willing to pay
11 for a stock in relation to what they expect to receive in return is the information that is
12 used to determine the cost of equity. For example, if investors are willing to pay more
13 than book value for a utility company that investors expect will earn a return on book
14 equity of 9%, this means that investors require less than a 9% return to be convinced to
15 buy shares of this company. Just as the market yield on a bond decreases when investors
16 bid up the market price of a bond, the yield also decreases for a common stock
17 investment when the stock price goes up. The DCF model is specifically designed to
18 recognize the difference in the value of earnings paid out as a dividend and retained
19 earnings. A properly applied DCF model maintains its accuracy irrespective of the
20 market-to-book ratio.

21 **Q. DO YOU AGREE WITH MR. D’ASCENDIS’ CRITICISM OF YOUR**
22 **CALCULATION OF THE AVERAGE EXTERNAL FINANCING RATE, OR “S”**

**IN YOUR BR+SV FORMULA, WHICH IS PART OF YOUR CONSTANT
GROWTH DCF METHODOLOGY?**

A. No. Mr. D'Ascendis' criticism is solely based on a mistaken interpretation of my intentions based on footnote [B] of Schedule ALR 5, page 5. The footnote he refers to states that negative values for growth are excluded from Column 10 of my schedule. The average financing rate I use of 0.63% comes from Column 11 of my schedule, which is an average of the overall annual growth rates of all six companies in my water proxy group from 2014 to the 2023 Value Line projections.

Two other approaches I considered for calculating the sustainable rate of external financing was to take the median of the six data points, which is 0.54%, or to take the average excluding the high and low, which is 0.41%. The approach of removing the two negative numbers suggested by Mr. D'Ascendis would also call for the removal of the abnormally high value for Aqua America, resulting in an average of 0.56%. In the end, I concluded that with the relatively small number of companies in my proxy group and considering Value Line provides data spanning nine years, the best approach was to take an average of all available data for all six companies, allowing any and all irregularities across companies and years to balance each other out.

IV. APPLICATION OF THE CAPM

Q. PLEASE SUMMARIZE MR. D'ASCENDIS' CRITICISMS OF YOUR CAPM.

1 **A.** Mr. D’Ascendis states that he has at least four concerns with the application of the
2 CAPM. His concerns are:

- 3 1. Use of current and not forecasted interest rates
- 4 2. Use of option-implied betas
- 5 3. Predictions contradict my prior testimony
- 6 4. Failure to use the ECAPM.

7 **1. Use of Current and not Forecasted Interest Rates**

8 I agree with Mr. D’Ascendis that “ratemaking and the cost of capital are prospective in
9 nature, i.e., forward looking.” However, as discussed further below, it is appropriate to
10 use the current yields of U.S. Treasury bonds as the risk-free rate in the CAPM because
11 the price of bonds, and their corresponding yields, are based on investor expectations.

12 **2. Option-Implied Beta**

13 **Q.** **PLEASE SUMMARIZE THE REASONS MR. D’ASCENDIS USES TO SUPPORT**
14 **HIS POSITION THAT OPTION-IMPLIED BETAS ARE NOT APPLICABLE TO**
15 **YOUR WATER PROXY GROUP AND THAT THE COMMISSION SHOULD**
16 **REJECT THE USE OF OPTION-IMPLIED BETAS FOR COST OF CAPITAL**
17 **PURPOSES IN GENERAL.**

18 **A.** Mr. D’Ascendis provides four arguments to support his conclusions, and they are as
19 follows:

- 20 1. He implies (though he does not directly state) that option-implied betas are only
21 useful when companies are undergoing fundamental change.

2. He states that “option-implied betas have relative difficulty when the ex-post (i.e., historical) betas are far from unity and performs [sic] better with higher beta stocks,” and thus implies that they not applicable or valid in the case of my water proxy group.

3. He argues that there isn’t enough liquidity in the options market for the companies in my water proxy group to give validity to the beta calculations in this case.

4. He argues that the authors of the paper I relied upon to calculate option-implied betas³ “do not endorse the use of option-implied betas as calculated by Mr. Rothschild for cost of capital purposes.”

Q. DO YOU AGREE WITH THE FOUR ARGUMENTS PROVIDED BY MR. D’ASCENDIS?

A. No. I strongly and unequivocally disagree with Mr. D’Ascendis’ arguments 1, 2, and 4 regarding the use of option-implied betas in this particular case or for cost of capital purposes in general. The third argument about liquidity allows more room for subjectivity and should definitely be considered on a case by case basis, but I disagree with Mr. D’Ascendis’ conclusion on this point as well as it applies to my water proxy group. I will address each of Mr. D’Ascendis’ four arguments in turn.

Q. ARE OPTION-IMPLIED BETAS ONLY USEFUL WHEN COMPANIES ARE UNDERGOING FUNDAMENTAL CHANGE, AS IMPLIED BY MR. D’ASCENDIS?

³ Bo-Young Chang, Peter Christoffersen, Kris Jacobs, and Gregory Vainberg, “Option-Implied Measures of Equity Risk”, Review of Finance, March 1, 2011.

1 **A.** No. Option-implied betas are calculated using only the most recent option trading data
2 available for a company and its selected beta index. This makes them entirely
3 independent from the historical pricing of that company's stock or its historical volatility,
4 and thus intrinsically "forward-looking." Option-implied betas are not a perfect
5 prediction of the future, but they represent the most up-to-date assessment and measure of
6 the risk expected by investors at any given time on a purely forward-looking basis. This
7 is valuable and useful for numerous purposes.

8 As per the quote selected by Mr. D'Ascendis on page 67, lines 1-9 of his Rebuttal,
9 from the paper I relied upon to calculate option-implied betas,⁴ "This may be an
10 important advantage when a company experiences major changes in its operating
11 environment or capital structure, in which case historical return data do not constitute a
12 reliable source for estimating betas." But to interpret that this means that option-implied
13 betas are exclusively useful when "companies are undergoing fundamental change," as
14 Mr. D'Ascendis suggests, is indisputably incorrect and not what the authors of the paper
15 intended to imply.

16 When no historical data is available, option-implied betas may in fact be the only
17 way available to calculate beta and risk. But even when historical data is available, this
18 forward-looking measurement of beta and overall risk can be much more reliable than a
19 five-year historical average which can take literally years to reflect even a permanent
20 change that may have an immediate effect on the level of risk perceived by investors.

⁴ Ibid., pg. 386.

1 Market, industry, regulatory, and general economic conditions, among numerous
2 other factors, are always in flux and exert constant influence on the operations of a
3 company. Their combined effect on the financial performance of such a company,
4 whether gradual or abrupt, is very complex. Even without fundamental changes taking
5 place, forward-looking option-implied betas are one of the best ways available to
6 quantify the combined effect of all such market forces on the overall risk expected by
7 investors at any given moment.

8 In summary, Mr. D'Ascendis' implied conclusion that option-implied betas are
9 only useful when "companies are undergoing fundamental change" is incorrect, is a
10 misinterpretation of what the authors of the paper intended, and should be disregarded.

11 **Q. ARE OPTION-IMPLIED BETAS FOR COMPANIES WITH HISTORICAL**
12 **BETAS THAT ARE FAR FROM UNITY INCORRECT OR UNRELIABLE AS A**
13 **GAUGE FOR MARKET-BASED RISK PERCEIVED BY INVESTORS, AS**
14 **IMPLIED BY MR. D'ASCENDIS?**

15 **A.** No. The two references to the paper I relied upon to calculate option-implied betas⁵ that
16 Mr. D'Ascendis uses to seek to discredit my use of option-implied betas do not actually
17 speak to the ability of option-implied betas to reflect current investor sentiment or their
18 perception of risk. The references, stating that "option-implied betas have relative
19 difficulty when the *ex post* beta is far from unity" and that "option-implied beta performs
20 better for higher beta stocks"⁶ are both from a section of the paper entitled "4.5

⁵ Ibid.

⁶ Ibid., pg. 417.

1 ANTICIPATING *EX POST* REALIZED BETA,” which in the words of the authors,
2 assesses “the ability of option-implied beta to anticipate changes in future beta.”⁷ “*Ex*
3 *post*” beta refers to the future beta from the point in time at which any given option-
4 implied beta is calculated. The relative difficulties and better performance referred to in
5 this section all refer to the accuracy with which option-implied betas are able to predict or
6 exactly match the actual beta of a stock going forward.

7 As an aside, there are numerous ways to calculate beta, including for this *ex post*
8 time horizon, so attempting to match future beta may well come down to finding the right
9 combination of variables. Some of the variables that can affect the precise value of beta
10 include the period of time for calculating returns, whether to use daily, weekly, or
11 monthly returns, and beta adjustments, such as that used by Value Line, among others. In
12 fact, in the same section, the paper states that “The performance of the option-implied as
13 well as hybrid betas improves when forecasting 1- and 2-year *ex post* betas,”⁸ and notes
14 that “the approach commonly used for historical betas that shrinks the betas toward unity
15 may lessen this effect [of making *ex post* betas far from unity less predictable].”⁹

16 But while the ability to predict future beta precisely is very relevant to traders or
17 algorithms that may rely on option-implied betas as accurate predictors of the future, in
18 the end, this is not so relevant for cost of capital purposes. As stated previously, option-
19 implied betas are not a crystal ball to see into the future, but rather they are a reflection of
20 the overall risk expected by investors for a particular company at a particular moment in

⁷ Ibid., pg. 413.

⁸ Ibid., pg. 414.

⁹ Ibid., pg. 417.

1 time. And this is of the utmost importance and relevance to cost of capital calculations,
2 regardless of whether those current market expectations come to pass or not.

3 As a result, regardless of their ability to accurately forecast the future or of our
4 ability to determine the best scope they are forecasting, option-implied betas remain one
5 of the best tools we have available to measure current investor expectations of risk. Mr.
6 D'Ascendis' misinterpretation of the authors' comments on this point should be
7 disregarded.

8 **Q. IS MR. D'ASCENDIS' ASSESSMENT OF THE LIQUIDITY OF THE OPTIONS**
9 **MARKET OF THE COMPANIES IN YOUR WATER PROXY GROUP**
10 **CORRECT?**

11 **A.** No. While liquidity is definitely an important issue when dealing with options and
12 should always be carefully monitored, Mr. D'Ascendis' claim that based on my
13 workpapers, "the average proxy group company had 13 call options and nine put options
14 traded throughout his option-implied beta calculation" is absolutely incorrect. The
15 numbers he is referring to represent the average number of strike prices per company per
16 calculation date with valid call and put options (i.e., out-of-the-money, non-zero bids),
17 respectively, and not the number of individual call or put option contracts used, as he
18 claims.

19 For the sake of clarity, I analyzed the data used in my option-implied beta
20 calculations for the six companies in my water proxy group in November and December

1 2019 in greater detail.¹⁰ The methodology started with a total average of 645 call and put
2 option strike prices for all six companies for each calculation date. Each strike price can
3 represent from a small handful to several hundred option contracts, each representing the
4 right to buy or sell 100 shares. The total average open interest on each calculation date in
5 these two months was 25,387, representing the right to buy or sell more than 2.5 million
6 shares. After filtering for non-zero bids and using only out-of-the-money options,
7 approximately one quarter of the strike prices are ultimately used for the calculation of
8 betas, representing approximately two-thirds of the trading volume and one half of the
9 open interest. It is also important to note that even strike prices with zero volume on a
10 given date can provide valuable data as long as there are valid bids and open interest at
11 that strike price.

12 The concept of adequate liquidity can be somewhat subjective and subject to
13 debate, but in my estimation the numbers above represent enough data points to produce
14 a reliable option-implied beta in this case. Furthermore, even though calculating option-
15 implied betas as of the most recently available trading date should be sufficient, I prefer
16 to calculate these betas going back a couple of months at least to identify trends and to
17 reinforce the validity of the calculations, as each calculation is completely independent of
18 the next, unlike beta calculations based on historical returns.

19 While the number of strike prices with valid options for water companies does
20 pale in comparison to the number of strike prices with valid options for the S&P 500, as

¹⁰ All underlying source data has been provided to Mr. D'Ascendis along with the workpapers of my original testimony.

1 Mr. D'Ascendis points out, this is also the case when comparing the volume of stock
2 trades of any water company vs. the S&P 500. The average volume of the six water
3 companies in my proxy group on December 31, 2019 was 436,983 compared to
4 2,893,810,000 for the S&P 500. This multiple of almost 7,000x certainly does not mean
5 that we should question the validity of the stock price of these water companies.

6 Mr. D'Ascendis' erroneous interpretation of the numbers in my workpapers completely
7 invalidates his statements and argument regarding liquidity, which should be disregarded.

8 **Q. DO YOU AGREE THAT THE AUTHORS OF THE PAPER YOU RELIED UPON**
9 **TO CALCULATE OPTION-IMPLIED BETAS¹¹ “DO NOT ENDORSE THE USE**
10 **OF OPTION-IMPLIED BETAS AS CALCULATED BY YOU FOR COST OF**
11 **CAPITAL PURPOSES,” AS ARGUED BY MR. D’ASCENDIS?**

12 **A.** No. To begin with, in the same paragraph as the quote cited by Mr. D'Ascendis on page
13 68, lines 4-7 of his Rebuttal, the authors state that the “option-implied beta approach
14 allows for the computation of a complete term structure of beta for each company so long
15 as the options data are available,”¹² so there is nothing inherent in the methodology that
16 limits it to a certain time horizon.

17 For many applications, including cost of capital, one could argue that the longer
18 the time horizon for the option-implied betas, the better. However, the limitation on the
19 forecasting horizon is always set by the longest expiration period of the options currently

¹¹ Ibid.

¹² Ibid., pg. 421.

1 traded in the market. Some companies trade options with expiration periods up to two
2 years or more into the future. The maximum expiration period for water companies
3 consistently seems to be in the neighborhood of seven to ten months. For consistency, I
4 chose to use six months for the time horizon of my option-implied betas.

5 Just because it may be better to use longer time horizons in place or in addition to a
6 six-month horizon, it does not mean that a six-month option-implied beta is of no
7 relevance or cannot be used. That would be paramount to saying you cannot use a one-
8 year Value Line EPS estimate, or that the minimum relevant forecast is two or three
9 years. In fact, for purposes of option-implied betas, it would be difficult to say if a time
10 horizon of one year, for instance, is necessarily always better than a time horizon of six
11 months. An option-implied forward-looking beta, even with a time horizon of less than
12 six-months, is still a useful tool in interpreting the current expectations of investors at any
13 given time.

14 The authors of the paper do not state that a six-month option-implied beta may
15 not or should not be used for cost of capital purposes, and ultimately it is not their role to
16 determine so. Throughout the paper, they give various ideas of how option-implied betas
17 could be used in various applications, but ultimately it is up to each field to refine the best
18 way to use them.

19 Mr. D'Ascendis' claim that the authors do not endorse the use of option-implied
20 betas as calculated by me for cost of capital purposes is incorrect and should be
21 disregarded.

1 **Q. SHOULD OPTION-IMPLIED BETAS BE USED IN COST OF CAPITAL**
2 **CALCULATIONS?**

3 **A.** Yes. For all of the reasons I have stated previously, option-implied betas are one of the
4 best tools currently available to measure the overall risk expected by investors at any
5 given moment in time, and that is fundamentally what cost of capital determinations
6 should be based on. As with other tools and methodologies we use regularly, option-
7 implied betas are not a silver bullet and should be used in conjunction with other valid
8 approaches to determine ranges of reasonableness for the cost of equity. The more valid
9 tools we use, the more we can narrow down or confirm these ranges of reasonableness to
10 ensure a more accurate result.

11 **3. Predictions contradict my prior testimony**

12 **Q. PLEASE RESPOND TO MR. D'ASCENDIS' CRITICISMS OF THE MRP**
13 **PORTION OF YOUR CAPM.**

14 **A.** Mr. D'Ascendis claims that the way I calculate the MRP portion of my CAPM contradicts
15 advice I quote from Warren Buffet in my Direct Testimony. As explained in my Direct
16 Testimony, Mr. Buffet states that nobody knows what capital markets will be in the
17 future. According to Mr. Buffet's advice, we should be cautious about using analyst
18 forecasts in cost of equity calculations. If the market is unpredictable, we should not try
19 to forecast capital markets in my MRP calculations. I do not try and forecast the market.
20 Instead, I use market data to measure what investors expect directly. Based on stock

options traded on the S&P 500, I was able to determine that investors expect less than a 32% probability of an 8.74% growth in the price of the S&P 500.

Mr. D'Ascendis claims that historical return data indicate that my market risk premium (8.16% - 9.0%) is "unduly low." He makes this claim by comparing the ten-year average market return of the S&P 500 (13.65%) to the market return expectation used in my CAPM (10.55%). Historical data is helpful in calculating the cost of equity only if investors expect the future to be like the past. According to stock options traded on the S&P 500, investors expect the S&P 500 will most likely (68.3% chance) provide a return of 10.55% or lower.

4. Failure to use ECAPM

Q. MR. D'ASCENDIS LISTS YOUR FAILURE TO USE THE ECAPM AMONG HIS CONCERNS WITH THE APPLICATION OF YOUR CAPM. PLEASE RESPOND.

A. I do not use the ECAPM because the evidence supporting its use is inconclusive. The ECAPM was invented by researchers as an attempt to fix, or adjust, the CAPM based on empirical evidence. Between 1931-1965, high beta stocks provided returns less than predicted by the CAPM. Over the same time period, low beta stocks provided returns greater than predicted by CAPM. The ECAPM offers a simple solution – increase return expectations for lower beta stocks and decrease return expectations of high beta stocks. This ECAPM fix is valid only if it is in response to a fundamental characteristics of stock returns that will continue in the future. Regarding the evidence for adjusting the CAPM

(e.g. using the ECAPM), *Principles of Corporate Finance*, a leading financial textbook used in business schools around the world, is cautious. The text book states:

...it is hard to judge how seriously the CAPM is damaged...The relationship among stock returns and firm size and book-market ratio has been well documented. However, if you look long and hard at past returns, you are bound to find some strategy that just by chance would have worked in the past.¹³

V. CURRENT MARKET ENVIRONMENT

Q. PLEASE SUMMARIZE MR. D'ASCENDIS' COMMENTS REGARDING MY INTERPRETATION OF CURRENT CAPITAL MARKETS.

A. In response to Mr. D'Ascendis' rebuttal testimony, I will address the following topics regarding my interpretation of current capital markets:

1. Stocks are expensive (high price to earnings ("P/E") ratios);
2. Interest rates (still historically low interest rates);
3. Low credit spreads;
4. Volatility Expectations;
5. Will the cost of equity remain low?

1. Stocks are expensive (high price to earnings ("P/E") ratios)

¹³ Brealey, Myers, and Allen (2017), *Principles of Corporate Finance*, 12th Edition, McGraw-Hill Irwin, New York, page 206.

1 **Q. DO YOU AGREE WITH MR. D'ASCENDIS' POSITION THAT AN INCREASE**
2 **IN THE WATER PROXY GROUP P/E RATIOS 2017 TO 2020 INDICATES A**
3 **HIGHER COST OF EQUITY THAN IN BGWC'S LAST RATE CASE?**

4 **A.** First of all, I agree with Mr. D'Ascendis that just because water utility P/E ratios have
5 increased by over 30% since BGWC's last rate case does not necessarily mean that the
6 cost of equity for BGWC has decreased. If P/E ratios were all that was needed to
7 calculate the cost of equity there would be no need for the DCF model or any other
8 model. I consider rising P/E ratios of water utility companies, and the overall market, as
9 one piece of information along with interest rates, credit spreads, implied volatilities,
10 among other factors.

11 Mr. D'Ascendis' conclusion that the cost of equity is increasing based on an
12 increasing EPS growth rate is flawed, however.

13 Mr. D'Ascendis' conclusion that the cost of capital has increased since 2017 is
14 unreliable because, as explained in my Direct Testimony, the EPS growth rates he uses
15 are unreliable.

16 **2. Interest rates (still historically low interest rates)**
17

18 **Q. MR. D'ASCENDIS CLAIMS THAT RATES IN THIS PROCEEDING SHOULD**
19 **BE SET BASED ON FUTURE INTEREST RATES, NOT CURRENT INTEREST**
20 **RATES. PLEASE RESPOND.**

1 **A.** I agree with Mr. D’Ascendis that “ratemaking and the cost of capital are prospective in
2 nature, i.e., forward looking.” His claim that economic forecasts must be prioritized over
3 current bond yields is false however, because these market-based yields are based on
4 investor expectations. As explained in my Direct Testimony, the yields on 30-year U.S.
5 Treasury bonds are market-based and therefore reflect investors’ expectations. Since
6 bond prices and yields are inversely related, an investor who expected long-term interest
7 rates to increase soon would not purchase 30-year U.S. treasuries because they would
8 lose money. In a liquid market like those for 30-Year U.S. Treasury bonds, the yield
9 reflects interest rate expectations of the marketplace. In other words, current market data
10 indicates what investors’ expect market conditions will be in the future.

11 **3. Low Credit Spreads**
12

13 **Q. MR. D’ASCENDIS CLAIMS THAT CHART 5 IN MY DIRECT TESTIMONY**
14 **DOES NOT DEMONSTRATE THAT THE COST OF EQUITY HAS**
15 **DECREASED ALONG WITH INTEREST RATES BECAUSE THE CREDIT**
16 **SPREAD BETWEEN U.S. TREASURIES AND CORPORATE BONDS IS NOT A**
17 **PROXY FOR THE COST OF CAPITAL. PLEASE RESPOND.**

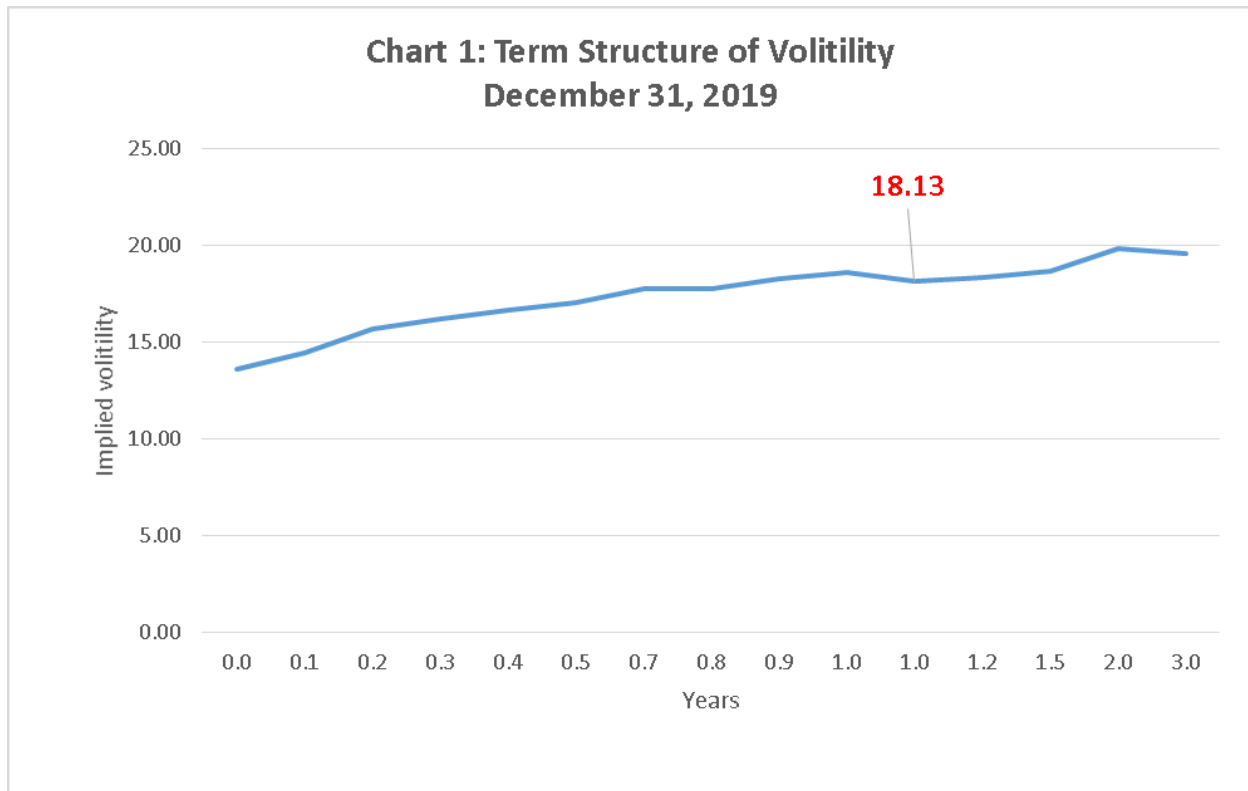
18 **A.** The analysis presented on pages 51-52 of his Rebuttal Testimony does not support his
19 claim because it does not measure how the cost of equity and credit spreads are related.
20 In order to show that the credit spreads are not a proxy for the cost of equity it would
21 require comparing credit spreads and the cost of equity. He does not do this. His

1 justification consists of a regression analysis to determine the relationship between
2 allowed returns (ROEs) and credit spreads between 2007 and 2019.

3
4 **4. Volatility Expectations**
5

6 **Q. PLEASE RESPOND TO MR. D'ASCENDIS' CLAIM THAT THE CURRENT**
7 **MARKET VOLATILITY INDEX, ("VIX") INDEX (DECEMBER 31, 2018) IS**
8 **IRRELEVANT TO THE COST OF EQUITY IN THIS PROCEEDING.**

9 **A.** Mr. D'Ascendis' claims that the VIX is "irrelevant to the cost of common equity in this
10 proceeding" because it is short-term (30-days into the future) while the "cost of capital is
11 a long-term concept." Just like P/E ratios, among other market data, the VIX Index is
12 another data point that can help paint a high-level picture of capital market conditions.
13 When I implement my cost of equity models I do not use VIX Index. I use investors'
14 volatility expectations over a significantly longer time period. In fact, I use an implied
15 volatility (18.13%) in my CAPM, which is almost identical to the implied volatility
16 (18.66%) cited by Mr. D'Ascendis in his Rebuttal Testimony. He claims that volatility
17 expectations over longer time periods are more relevant to the cost of equity than shorter
18 time periods. I agree and therefore I use volatility expectations over longer time periods
19 than the VIX in my CAPM analysis. As shown in the chart below, investors expect
20 volatility to be higher in the future. Over the next few weeks investors expect market
21 volatility of under 15%. 6 months (0.5 years) out volatility expectations increase to about
22 17%. 12 months (1.0 years) out volatility expectations are about 18% and by 3-years out
23 they are about 20%.



Will the cost of equity remain low?

Q. PLEASE RESPOND TO MR. D’ASCENDIS’ CLAIM THAT YOU BELIEVE THE COST OF CAPITAL SHOULD NOT BE BASED ON EXPECTED MARKET CONDITIONS.

A. Current capital markets provide the most reliable information regarding future market expectations. The price investors are willing to pay for stocks and bonds today is based on what they expect capital markets will be in the future. My market-based approach to calculating the cost of equity is “prospective in nature, i.e. forward looking”, and consistent with ratemaking principles.

VI. FINANCIAL RISK ADJUSTMENT

Q. PLEASE RESPOND TO MR. D'ASCENDIS' OPPOSITION TO YOUR 10 BASIS POINT FINANCIAL RISK ADJUSTMENT.

A. As discussed in my Corrected Direct Testimony, BGWC (8.65%) has a lower cost of equity than the Water Proxy Group (8.75 %) because BGWC is proposing to use a higher common equity ratio (52.91%) than the Water Proxy Group average (50.4%) and therefore has a correspondingly lower risk. My financial risk adjustment is consistent with the financial facts and should be used to determine BGWC's cost of equity.

VIII. CONCLUSION

Q. PLEASE SUMMARIZE YOUR REACTION TO MR. D'ASCENDIS' REBUTTAL TESTIMONY.

A. Mr. D'Ascendis' criticisms of my Direct Testimony are unsupported and should be rejected. If adopted, my cost recommendations would allow BGWC to raise the capital it needs to provide safe and reliable service because my recommendations are consistent with investors' return expectations.

Q. DOES THIS CONCLUDE YOUR SURREBUTTAL TESTIMONY?

A. Yes.